CLAIMS

1. An alloyed molten zinc plated steel sheet characterized by comprising a steel sheet including, by wt%,

C: 0.05 to 0.40%,
Si: 0.2 to 3.0%, and
Mn: 0.1 to 2.5% and
further including at least one or two or more types of:
P: 0.001 to 0.05%,
S: 0.001 to 0.05%,
Al: 0.01% to 2%,
B: 0.0005% to less than 0.01%,
Ti: 0.01% to less than 0.1%,
V: 0.01% to less than 0.3%,
Cr: 0.01% to less than 1%,
Nb: 0.01% to less than 0.1%,
Ni: 0.01% to less than 2.0%,
Cu: 0.01% to less than 2.0%,
Co: 0.01% to less than 2.0%,
Mo: 0.01% to less than 2.0%,
with the balance comprised of Fe and unavoidable impurities, having on its surface a Zn alloy plating layer comprised of Fe in a concentration of 7 to 15 wt%, Al in a concentration of 0.01 to 1 wt%, and the balance of Zn and unavoidable impurities, said plating layer containing oxide particles of at least one type of oxide selected from an Al oxide, Si oxide, Mn oxide, Al and Si complex oxide, Al and Mn complex oxide, Si and Mn complex oxide, and Al, Si, and Mn complex oxide alone or in combination.

2. An alloyed molten zinc plated steel sheet as set forth in claim 1, characterized in that said oxide particles are comprised of at least one of silicon oxide, manganese oxide, aluminum oxide, aluminum silicate, manganese silicate, manganese aluminum oxide, and manganese aluminum silicate.

3. An alloyed molten zinc plated steel sheet as set forth in claim 1, characterized in that an average diameter of the particle size of said oxide is 0.01 to 1 μm.

4. An alloyed molten zinc plated steel sheet as set forth in any one of claims 1 to 3, characterized in that the structure of said steel sheet has a complex structure of a ferrite phase, bainite phase, and residual austenite phase.

5. A process of production of an alloyed molten zinc plated steel sheet comprised of the ingredients described in claim 1 by a continuous molten zinc plating system, said process of production of an alloyed molten zinc plated steel sheet characterized by making a heating temperature T at a recrystallization annealing step in a reducing furnace of said system 650°C to 900°C, passing the steel sheet through an atmosphere where a ratio PH_2O/PH_2 of the steam partial pressure PH_2O and hydrogen partial pressure PH_2 of the atmosphere of said reducing furnace is $1.4x10^{-10}T^2-1.0x10^{-7}T+5.0x10^{-4}$ to $6.4x10^{-7}T^2+1.7x10^{-4}T-0.1$, forming internal oxide at a region from the surface of the steel sheet to a depth of 1.0 μm, then successively performing molten zinc plating treatment and alloying treatment.

6. A process of production of an alloyed molten zinc plated steel sheet as set forth in claim 5, characterized in that said oxide particles are comprised of at least one of silicon oxide, manganese oxide, aluminum oxide, aluminum silicate, manganese silicate, manganese aluminum oxide, and manganese aluminum silicate.

7. A process of production of an alloyed molten zinc plated steel sheet as set forth in claim 5, characterized in that an average diameter of the particle size of said oxide is 0.01 to 1 μm.

8. A process of production of an alloyed molten

zinc plated steel sheet as set forth in any one of claims 5 to 7, characterized in that the structure of said steel sheet has a complex structure of a ferrite phase, bainite phase, and residual austenite phase.